

### **REMARKS**

By this amendment, Applicants have included the features of claims 6, 12 and 14 into claim 1. Claims 2-5 have been amended to make them consistent with amended claim 1. Claims 7, 8, and 9 have been amended to make them depend from claim 5. Claim 11 has been amended to depend from claim 1 and claim 13 has been amended to depend from claim 11. Claims 6, 12, and 14 have been canceled. The specification has been amended to add a section heading for the claim as recommended by the Examiner. These amendments do not add new matter. Applicants respectfully request entry of these amendments and allowance of the pending claims.

#### **I. Claim Objection**

The Examiner objected to claim 6 for reciting the third iteration of “material.” In response, Applicants have canceled claim 6 thereby rendering this rejection moot.

#### **II. Double Patenting Rejection**

The Examiner rejected claims 1-11 for obvious double patenting in view of U.S. Patent No. 6,858,193 to (Ruwisch). Applicants respectfully disagree. Nevertheless, to advance prosecution, Applicants file a terminal disclaimer in view of U.S. Patent No. 6,858,193 thereby rendering this rejection moot.

### **III. Claim Rejections – 35 USC § 102(b)**

The Examiner rejects claims 1-11 as allegedly anticipated by US 2003/0125202 (Ruwisch '202). The Examiner also rejects claims 1-4, 6-8 and 11 under 35 USC § 102(b) as allegedly anticipated by US Patent No. 4,883,783 (Burk). Applicants respectfully disagree. Nevertheless, to advance prosecution, Applicants have amended claim 1 to include the features of claim 12 into claim 1. The Examiner concedes that claim 12 is not anticipated by Ruwisch '202 and Burk, as the Examiner has not rejected claim 12 under 35 USC § 102(b) based on these references. Therefore, this rejection is now moot.

### **IV. Response to Rejections of Claims Under 35 U.S.C. §103(a)**

Claims 1-14 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Ruwisch '202 in view of US 6,350,421 (Strehlau). Claims 1-14 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Burk or Burk in view of Strehlau. Applicants respectfully traverse these rejections.

The teachings of more than one reference may be considered in combination provided one of ordinary skill in the art would combine the references in that way to solve the problem facing the inventor. *KSR International Co. v. Teleflex Inc.* 127 S. Ct. 1727, 1734 (April 30, 2007). The Applicants respectfully submit that the cited prior art does not render the present claims obvious, as one of ordinary skill in the art would not combine the references in the manner that the Examiner applies them and the combination fails to make obvious every element as required.

In Ruwisch '202 at Table 3, the NO<sub>x</sub>-storage component barium oxide BaO is consistently deposited on a Ce/Zr mixed oxide. In contrast to Ruwisch '202, the present application recognizes that the NO<sub>x</sub> storage efficiency can be unexpectedly improved over Ruwisch '202 by depositing the NO<sub>x</sub> storage component BaO not onto a Ce/Zr mixed oxide but on a homogeneous Mg-Al oxide doped with ceria (CeO<sub>2</sub>) (see Applicants' specification Table 3). In embodiments of Applicants' inventive examples (C1, C2, C3, C4 and C5) barium oxide is always deposited on the CeO<sub>2</sub>/Mg-Al oxide.

While Ruwisch '202 used the homogeneous Mg-Al oxide (without doping with CeO<sub>2</sub>) only as a support material for platinum and/or palladium, in the present application this homogeneous Mg-Al oxide after doping with CeO<sub>2</sub> is used as support for the NO<sub>x</sub> storage component (which is *e.g.*, BaO) and also as support for the catalytically active precious metal component (platinum and/or palladium). The precious metal components may either be deposited together with the NO<sub>x</sub> storage component on the same particulates of the homogeneous Mg-Al-oxide or the precious metal components and the NO<sub>x</sub> storage component are segregated from one another by depositing them on different particles of the homogeneous Mg-Al oxide doped with CeO<sub>2</sub>. The measurements of the NO<sub>x</sub> storage efficiency show that the NO<sub>x</sub> storage catalyst of the present application is superior over the NO<sub>x</sub> storage catalyst of Ruwisch '202. This finding could not be expected from reading Ruwisch '202 and also not from the combination of Ruwisch '202 in view of Strehlau or Burk.

Burk describes a composition of matter for conversion of hydrocarbons. According to Burk, his composition is an intimate admixture of a major amount of solid particles capable of promoting hydrocarbon conversion and a minor amount of discrete entities having a composition different from the solid particles and comprising at least one magnesium-aluminum-containing spinel for sulphur oxide removal. But Burk's discrete entities occur only in intimate admixture with the solid particles for hydrocarbon conversion. This is in contrast to Applicants' nitrogen oxide storage catalyst applied in the form of a coating to an inert honeycomb, which would not be obvious to one of ordinary skill in the art on reading Burk because Burk is dealing with hydrocarbon conversion and not with nitrogen oxide storage in vehicle exhaust gases.

Further, claim 1 of the present application has been amended to include the catalysts described in Table 3 (C1, C3 and C5). In Table 3, the platinum group metals and the NO<sub>x</sub> storage component BaO are deposited on segregated parts of homogeneous Mg-Al oxide doped with cerium oxide. This feature is not disclosed or made obvious by Burk. The discrete entities of Burk contain all of these components combined in one discrete entity or particle.

With regard to claim 7, it specifies a material which contains an oxygen storage material as discrete particles besides the nitrogen oxide storage material; see the examples C2, C4 and C5 of Table 3. Such a separation between these two components is not disclosed or made obvious by Burk.

With regard to claim 11, the Examiner equates the Mg:Al atomic ratio with the weight percentage of MgO in the spinel. Applicants respectfully submit that this is incorrect. The Mg-Al-spinel is an equimolar composition of MgO and  $\text{Al}_2\text{O}_3$  ( $\text{MgAl}_2\text{O}_4$ ). Thus, a Mg-Al-spinel has a Mg:Al-atomic ratio of 0.5. Since the molar weight of MgO is 40.3 and the molar weight of  $\text{Al}_2\text{O}_3$  is 102, the weight percentage of MgO relative to the weight of the Mg-Al-spinel is  $40.3/(40.3+102) = 28.32 \text{ wt.-%}$  and not 50 wt.-%. For Mg:Al atomic ratio of 0.25 the spinel consists of 1 mol of MgO and 2 moles of  $\text{Al}_2\text{O}_3$  giving a weight percentage of MgO of only 16.5 wt.-% and not 25 wt.-% as assumed by the Examiner.

Regarding claims 9 and 10, Applicants respectfully submit that Burk explicitly prefers palladium and platinum, see col. 3, lines 20 to 21 of Burk. There is no hint in Burk that rhodium might be beneficial over the use of palladium or platinum. In the present application, the rhodium promotes the chemical reduction of  $\text{NO}_x$  to  $\text{N}_2$  after release of  $\text{NO}_x$  from the storage material. Burk does not recognize the significance of this because Burk is only interested in promoting sulfur dioxide oxidation by using platinum on alumina; see col. 9, lines 16 to 18.

With regard to Strehlau and Burk, Applicants respectfully submit that one of ordinary skill in the art would not combine Burk with Strehlau as the invention of Burk is directed to a composition of matter for conversion of hydrocarbons while the invention of Strehlau is directed to a nitrogen oxides storage catalyst for cleaning the exhaust gas of automotive engines. Moreover, the composition of Burk consists of two parts, namely solid particulate material for promoting hydrocarbon conversion and discrete entities for removing sulfur oxides from the flue gas. Accordingly, Ruwisch '202 in view of Strehlau or Burk are solving different problems than those facing the current inventors

and Applicants respectfully submit that Ruwisch '202, Strehlau or Burk, alone or in combination do not make the currently pending claims obvious.

**Conclusion**

Reconsideration and allowance are respectfully requested. No fee other than the enclosed fee for one-month extension of time is believed to be due with respect to the filing of this Response.

If any further fees are deemed due, or an overpayment has been made, please charge, or credit, Deposit Account No. 11-0171 for such sum. If the Examiner has any questions regarding the present application, the Examiner is cordially invited to contact Applicant's attorney at the telephone number provided below.

Respectfully submitted,

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